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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/698,948	11/03/2003	Ari Karkkainen	4090-9	5027

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EXAMINER	
INGHAM, JOHN C	

ART UNIT	PAPER NUMBER
2814	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/698,948	KARKKAINEN, ARI	
	Examiner	Art Unit	
	John C. Ingham	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *9,10,12-15,17-29,31-33 and 35-37* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *9,10,12-15,17-29,31-33 and 35-37* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 November 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 13 April 2007 has been entered.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims **9-10, 17-18, 26-29 and 31-33** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta and Bona (US 5,259,049) and further in view of Glebov.

4. Regarding claims **9, 12, 17 and 26**, Gupta discloses an optical assembly in Fig 5 and Fig 6 comprising: first and second optical components (laser diode items 38-46, waveguide 60, col 4 ln 30-34), at least the first optical component having an optical confinement region and an optical axis in use, and each having a bonding surface (Fig 5 item 51, Fig 6 item 68); and a shared planar substrate (30, 62), wherein said first optical component is flip chip mounted on the shared substrate (Fig 6, col 1 ln 34) by means of

its bonding surface and the first and second components are supported by the shared substrate such that their respective optical confinement regions are optically coupled in use.

Gupta does not specify that the first component comprises a spacing layer which determines the distance from the bonding surface to the optical axis for the first component to achieve said optical coupling in use.

Bona teaches that the thickness of waveguide layers (Fig 8A item 80, the cladding layer) can be precisely controlled in the vertical direction to accurately align the waveguide core with the diode active layer and give good coupling between the two components (col 6 ln 64-65). The cladding layer is therefore used as a spacing layer and provides the whole distance from the bonding surface to the optical confinement region. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Bona on the device of Gupta in order to give good coupling between the two optical components. Gupta and Bona do not, however, specify that said spacing layer comprises a glass material having both organic and inorganic components.

Glebov teaches the use of organic/inorganic glass hybrids as cladding layers due to its high transparency (col 6 ln 14-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Glebov (a hybrid glass cladding layer or spacing layer) on the device disclosed by Gupta and Bona due to its high transparency.

5. Regarding claim **18**, Gupta discloses in Figure 6 the assembly of claim 9 wherein the spacing layer (clad layer 44) provides only part of the distance between the bonding surface (68) and the confinement region, because the rest of the distance is provided by contact 46.

6. Regarding claim **27**, Gupta discloses the assembly of claim 9 wherein the laser diode comprises gallium arsenide, a III-V material.

7. Regarding claims **28, 29 and 31**, Gupta discloses an optical assembly in Figs 5 and 6 comprising at least first and second optical components (laser diode items 38-46, waveguide 60, col 4 ln 30-34) flip chip mounted (col 1 ln 30-34) in optical alignment with each other, each component comprising at least one layer and a substrate (30 of GaAs, 55 of $LiTaO_3$) and providing an optical confinement region in use (between layers 40 and 42 of the diode, and the dotted line of the waveguide), wherein the optical assembly further comprises a planar shared substrate (62), the first and second optical components each being flip chip mounted (Fig 5, Fig 6, col 1 ln 30-32) so that its optical confinement region lies between its respective substrate and the shared substrate, and wherein at least one of the components (waveguide) comprise a spacing layer (below dotted line) between the optical confinement region and the shared substrate.

Gupta does not specify that the first component comprises a spacing layer which determines the distance from the bonding surface to the optical axis for the first component to achieve said optical coupling in use.

Bona teaches that the thickness of waveguide layers (Fig 8A item 80, the cladding layer) can be precisely controlled in the vertical direction to accurately align the

waveguide core with the diode active layer and give good coupling between the two components (col 6 ln 64-65). The cladding layer is therefore used as a spacing layer. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Bona on the device of Gupta in order to give good coupling between the two optical components. Gupta and Bona do not, however, specify that said spacing layer comprises a glass material having both organic and inorganic components.

Glebov teaches the use of organic/inorganic glass hybrids as cladding layers due to its high transparency (col 6 ln 14-18). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Glebov (a hybrid glass cladding layer or spacing layer) on the device disclosed by Gupta and Bona due to its high transparency.

8. Regarding claim **32**, Gupta discloses in Figure 1 the assembly of claim 31 wherein the substrate (22) comprised by the first component (10) has a different depth from the substrate (26) comprised by the second component when both components are flip chip mounted.

9. With regards to claim **33**, Gupta discloses the assembly of claim 9 wherein at least one of the first and second components is provided with an electrical connection (46) by means of its bonding surface (Fig 6).

10. Claims **12-13 and 35-37** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta, Bona and Glebov as applied to claim 9 above, and Tada

(5,684,902). Gupta shows in Fig 1 wherein the distance from the bonding surface to the optical axis for the first component (thickness of item 2 under axis 10) is different from the bonding surface to the optical axis for the second component (thickness of item 6 under axis 10), but Gupta, Bona and Glebov do not specify the shared substrate providing a non-planar surface on which both first and second components are mounted.

Tada teaches in Figure 1 a structure wherein the substrate (1) has a groove (2) cut into it for mounting of the second component (6), the groove allowing automatic and accurate positioning of the second component (col 1 ln 45-50). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the non-planar surface of Tada on the device disclosed by Gupta in order to accurately position a component.

11. Regarding claim **13**, Glebov teaches the use of organic/inorganic glass hybrids as substrates (col 4 ln 20) due to its high transparency (col 6 ln 14). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Glebov for a highly transparent substrate.

12. Regarding claims **35-37,** Tada discloses a non planar (discontinuous) shared substrate, but does not disclose wherein an optical cladding layer of the first component and a support surface for the second component are provided by areas of a layer fabricated on the shared substrate, and wherein a glass material having both organic and inorganic components provides a non-planar, or discontinuous, surface.

Glebov teaches the use of organic/inorganic glass hybrids (col 6 ln 15-20) as cladding layers and substrates (col 4 ln 20) due to its high transparency (col 6 ln 14). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Glebov (a hybrid glass substrate) for a highly transparent substrate which also acts as a cladding layer for the first component and a support surface of the second component.

13. Claims **14-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta, Bona and Glebov as applied to claim 9 above, and further in view of Blauvelt (US 6,987,913). Gupta, Bona and Glebov do not disclose wherein the distance from bonding surface to optical axis for the two components is within 300nm, or 100nm.

Blauvelt teaches that the desired objectives of optical junctions are vertical position accuracies of 20nm (col 8 ln 58-59), and teaches a structure of passively aligned photodiodes and waveguides (Fig 20B). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Blauvelt to mount two optical components with optical regions aligned within 20nm of each other, since optical power transfer can be maintained above the 90% level in this arrangement (col 8 ln 60).

14. Claims **19-22, 24, and 25** are rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta, Bona and Glebov as applied to claim 9 above, and further in view of Nashimoto (US 6,816,660). Gupta, Bona and Glebov do not disclose wherein

the glass material comprises an inorganic matrix provided in part by a metal alkoxide or salt that has been hydrolyzed.

Nashimoto teaches that glass may be formed by applying metal salts by a sol-gel method and heated (col 11 ln 32-36), producing an extremely smooth thin film with low light loss (col 11 ln 40- 42). Various types of metals and organic compounds are used in metal salts, including those in groups 3A, 3B, etc. of the periodic table. Although the claim language "wherein the glass material is adapted to be processed..." describes a product by process (see MPEP 2113), Nashimoto teaches that the glass material is processed at a temperature ranging from 100° to 500°C. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Nashimoto in order to produce an extremely smooth thin film with low light loss.

15. Claim **23** is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta, Bona, Glebov and Nashimoto as applied to claim 21 above, and further in view of Kaneko. Gupta, Bona, Glebov, and Nashimoto fail to specify that the glass material comprises a thermal initiator to polymerize the glass material.

Kaneko teaches a method of making an optoelectronic material comprising a thermal initiator (silane chloride) for polymerization (abstract), which has an easily controllable refractive index (col 3 ln 38-39). It would have been obvious to one of ordinary skill in the art at the time of the invention to use the teachings of Kaneko to make a glass with easily controlled refractive index.

Response to Arguments

16. Applicant's arguments with respect to claims 9-11, 17-18, 26-33, and 35-37 have been considered but are moot in view of the new ground(s) of rejection. However, reference is made to the glass plate of Glebov in col 4 ln 20 in order to show that the substrate may be made of the hybrid glass. Regarding the argument on page 9, Glebov teaches the use of the organic/inorganic hybrid layer for cladding layers, which act as spacer layers in the device of Gupta and Bona.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Ingham whose telephone number is (571) 272-8793. The examiner can normally be reached on M-F, 8am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

John C Ingham
Examiner
Art Unit 2814

jci

HOWARD WEISS
PRIMARY EXAMINER